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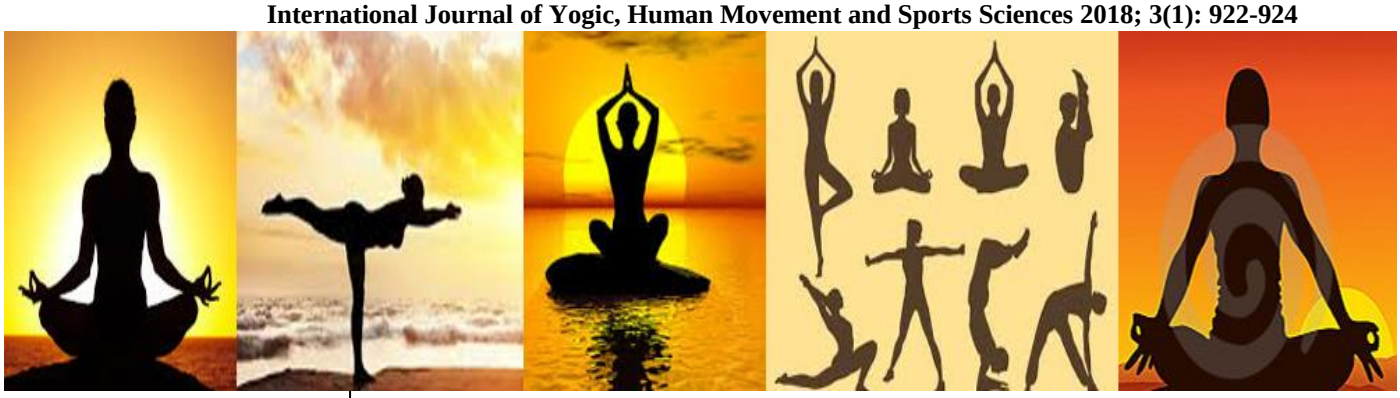

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Effect of isolated and combined core strength training and yoga practices on selected biomotor variables among adolescent school boys

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Abstract
The core described as the human body except for limbs, specifically as runners and yoga have a long history and a rich depth of knowledge and are both essential aspects to examine and investigate in people. Based on the concept the study design to find out the effect of isolated and combined core strength and yoga practices on selected biomotor parameters of adolescence boys. For the purpose of the study 45 Adolescent School boys from Government Higher Secondary School Kumarachi, Tamil Nadu were selected as subjects. The age rang of the selected subjects from 14 years to 17 years. The subjects were divided into three groups of fifteen namely core strength training group (n=15), yoga practice group (n=15) and combined core strength yoga practices group (n=15). The speed and explosive power were selected as biomotor variables. The variables were tested by using 50 m dash and Sarjent jump. The experimental groups underwent there training for 12 weeks, 4 days per week, 45 to 60 minutes per day with suitable warming up and cooling down exercise. The criterion variables were tested prior to and immediately after the training programme. The collected data were analysed using ANCOVA (analysis of covariance) and scheffe's post hoc test was applied to know the paired mean differences if the optioned 'f' ratio was significant. The level of significance fixed at.05. After investigating the study, there was a significant difference among experimental groups on selected speed and power parameters. The study also shows that the combined training group shows better improvement on criterion variables when compared with isolated training groups.

Keywords: core strength, yoga, combined, speed, power

Introduction
According to the principle of specificity, specific exercises elicit specific adaptations, creating specific training effects. Furthermore, sport scientists are more interested in finding the best training method to gain the best training benefits with a minimum cost of time and energy (Baechle 1994) [13].

The terms "core" or "core strength" are some of the most common phrases heard around the gym or track in recent years. Many runners would accept the idea that it would be desirable to have a strong core, but rarely do we think about what that really means or why exactly it would be helpful. Core strength should not be confused with having a rippling six-pack like a model on an exercise machine infomercial. Although many people with very well defined front abdominal muscles do have a strong core, it is not one and the same.

The core could be described as your body except for your limbs, but thinking specifically as runners, your core comprises the parts of your trunk that help stabilize you to resist forces of gravity and allow you to effectively operate those same limbs in the direction and at the speed (Garcia 2000) [12], core strength training results in an increased muscle force, glycolytic enzyme activity, intracellular ATP, and muscle hypertrophy (Tanaka 1998) [16].

Yoga is also commonly understood as a therapy or exercise system for health and fitness. While physical and mental health are natural consequences of yoga, the goal of yoga is more far-reaching. "Yoga is about harmonizing oneself with the universe. It is the technology of aligning individual geometry with the cosmic, to achieve the highest level of perception and harmony."

Yoga does not adhere to any particular religion, belief system or community; it has always been approached as a technology for inner wellbeing. Anyone who practices yoga with involvement can reap its benefits, irrespective of one's faith, ethnicity or culture.

Different Philosophies, Traditions, lineages and Guru-shishya paramparas of Yoga lead to the emergence of different Traditional Schools of Yoga example, Jnana-yoga, Bhakti-yoga, Karma-yoga, Dhyana-yoga, Patanjali-yoga, Kundalini-yoga, Hatha-yoga, Mantra-yoga, Laya-yoga, Raja-yoga, Jain-yoga, Bouddha-yoga etc. Each school has its own principles and practices leading to altimate aim and objectives of Yoga. (Dudley 1985) [7, 14]. Now-a-days, millions and millions of people across the globe have benefitted by the practice of Yoga which has been preserved and promoted by the great eminent Yoga Masters from ancient time to this date. The practice of Yoga is blossoming and growing more vibrant every day. To date, we are unaware of any research investigating the effects of a whole body combined training program on speed and power performance in adolescence boys.

Combined training has been commonly used by athletes to improve neuromuscular responses and energy systems (Dudley 1985) [7, 14]. Several studies have shown that combined training results in a development of muscle strength or power. In the past decade, combined strength and yogic practices has received much attention as a form of training. Many of previous investigations have examined several variables during combined training (Leveritt *et al* 1999) [10]. Moreover, they have demonstrated that the impact of combined training appears to be more determinable to potential strength gains and not to aerobic power (Rahnama *et al* 2007) [11]. Additionally, after combined strength and endurance training, investigators have noted positive changes in body systems (Garcia *et al* 2007) [12].

Methods and Material

Selection of subjects and variables

For the purpose of the study 45 adolescent boys from Government Higher Secondary School Kumarachi, Tamilnadu. Wear selected as subject. The age range of the selected subjects from 14 years to 17 years. The subjects were divided into three groups of fifteen namely core strength training group (n=15), yogasana practice group (n=15) and combined core strength yogasana training group (n=15). The speed and explosive power were selected as psychomotor variables. The variables were testes by using 50 m dash and Sarjent jump.

Training programme

The experimental groups underwent there training for 12 weeks, 4 days per week, 45 to 60 minutes per day with suitable warming up and cooling down exercise. The core strength training group underwent training on lateral leg roll, abdominal brace, abdominal crunch, ball rollout, hanging knee raise, ab reverse crunch, pushups and so on with 60 to 75% of intensity from their 1RM, the yogasana practice group underwent suriyanamaskar, pranayama, meditation, padahastasana, paschimottanasana, naukasana, ustrasana, uttanpadasana, puchangasana, chakrasana, thanurasana, yogamuthra, mayurasana and so on and the combined training group underwent training on both core strength and yogasana practices in alternative days. The criterion variables were tested prior to and immediately after the training programme.

Statistical Procedure

The collected data were analysed using ANCOVA (analysis of covariance) and scheffe's post hoc test was applied to know the paired mean differences if the optioned 'f' ratio was significant. The level of significance fixed at.05.

Result

Table I: Ancova on Psychomotor Parameters of Core Strength Yogasana and Combined Training Group

Variables	Core Strength Group	Yoga Group	Combined Group	SOV	Sum of square	Df	Mean square	'F' Ratio
Speed	7.61	7.68	7.54	B	0.15	2	0.08	3.74*
				W	0.84	41	0.02	
Explosive Power	25.41	24.84	28.47	B	113.84	2	56.923	463.40*
				W	5.036	41	0.12	

*Significance at.05 level of confidence

The Table Value Required For Significance at 0.05 level with df 1 and 41 Is 3.22

The obtained f ratio for all the selected psychomotor variables such as speed and explosive power are significance at.05 level. Hence, scheffe's post hoc test was employed and presented in table –II

Table II: Scheffe' s Post Hoc Test on Speed and Power Parameters

Variables	Mean Difference			Confidence Interval
	Core Strength Group Vs Yogasana group	Core Strength Group Vs Combined Group	Yogasana group Vs Aerobic Group	
Speed	0.07	0.14*	0.07	0.13
Explosive Power	0.57*	3.63*	3.06*	0.30

*Significance at.05 level of confidence

The result of post hoc test shows that combined training group was better in all selected variables then core strength yogasana training group. There was no significance of speed on combined and core strength group & core strength and yogasana practice group. The rest of the paired mean differences were found significant. Hence, it was concluded that combined training is the best training for develop speed and power.

Discussion

The findings of similar investigation (Bloomer *et al*. 2005) of the application of combined training in other sports may indirectly confirm our conclusions. Other investigations that studied simultaneous training for the development of speed and muscle power in a long-time period (Hennessy and Watson 1994) [1] indicated the possibility of a decrease in physical abilities in athletes with a training experience.

The abilities that require demonstration of power, i.e. large muscle power and speed are the most susceptible for large-extent and high- intensity trainings to which elite athletes. The successful combination of training depends on many factors such as the athlete's genetic potential, length of training experience, current physical preparation form, intensity and extent of training, optimal periodization, nutrition and supplementation etc. The combined performed training for strength and endurance induces the increase in anaerobic power and maximal oxygen uptake.

A number of previous studies reported the greatest speed in the core training group than the combined group, whereas (Park *et al* 2003), reported the highest explosive power percentage in combined training group. Therefore, combined training is an effective method in improving core strength (Nader 2006) [3]. The results of this study also showed that anaerobic power significantly increased after training programs in both exercise groups compared with the control group. In line with this, most of the previous studies reported an increase in VO2max in endurance and combined groups. However, some of these studies suggested significant reduction in VO2max in the resistance training group (Balabinis *et al.* 2003) [4].

Conclusion

The study concluded that the combined training was the best training method for improving speed and power parameters. This conclusion of this study may help the trainer design the optimal exercise program for athletes.

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